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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,846	08/18/2003	Michael Ben Sellers	133859 (MHM 14930US01)	4471
23446	7590	09/16/2004	EXAMINER FETZNER, TIFFANY A	
MCANDREWS HELD & MALLOY, LTD 500 WEST MADISON STREET SUITE 3400 CHICAGO, IL 60661			ART UNIT 2859	PAPER NUMBER

DATE MAILED: 09/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/642,846

Applicant(s)

SELLERS ET AL.

Examiner

Tiffany A Fetzner

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>08/18/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 08/18/2003 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner. The examiner's initialed 1449 form is attached to this office action

Drawings

2. The Formal drawings submitted December 23rd 2003 have been approved by the official draftsman, [See the attached PTO 948 official draftsman review form] and are acceptable to the examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1, 2, 4, 8, 16, and 20** are rejected under **35 U.S.C. 102(b)** as being anticipated by **Feenan** PCT publication WO 01/25808 A1 published 12 April 2001.

5. With respect to **Claim 1**, and corresponding MRI system **claim 14**, **Feenan** teaches and shows "A magnetic resonance imaging (MRI) device/system" [See abstract, figure 2], "comprising: an inner gradient coil assembly" (i.e. the primary set of conductors that comprise gradient coil 2 of figure 1" which are shown to be "proximate a patient positioning area;" [See the imaging bore of figure 1 in which a subject is placed] "an outer gradient coil assembly proximate a magnet assembly;" [See the secondary set of conductors that comprise gradient coil 2 of figure 1, which are actively screened because the secondary gradient coils of the assembly are radially spaced apart from each other and connected in series opposition to cancel any external field. [See page 1 lines 6-17; page 2 lines 9-12; page 2 line 21 through page 4 line 18] "and a damping layer" (i.e. soundproofing material / rubber foam) "sandwiched between" (i.e. within) "said inner and outer gradient coil assemblies" (i.e. the gradient assembly component 2

which is comprised of the primary and secondary conductors.) [See page 2 lines 9-12; page 1 lines 6-17; col. 3 lines 6-7] The examiner notes that in the **Feenan** gradient system that comprises gradient component 2 is further comprised of the primary and secondary gradient conductor assemblies of figure 1 which are actively screened and the gradient coil liner of figure 2.

6. With respect to **Claim 2**, **Feenan** teaches and shows that "said damping layer comprises at least one high modulus cylinder" (i.e. the acoustic liner of the **Feenan** reference which is cylindrical in form, [See figure 2] is "sandwiched between two viscoelastic layers.") [See col. 6 line 20 through col.. 7 line 31, where the acoustic liner between the two sets of x,y, and z gradient coil primary/secondary conductors which actively screen the gradient coils on either side of the imaging bore, have a compressible insulating material component 12 such as neoprene form is sandwiched between the inner sheet conductors 9,10 and the outer sheet conductors 13, 14; on either side of the acoustic liner. The examiner notes that a layers of neoprene form are intrinsically "viscoelastic layers."] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claim 1** also apply to **claim 2** and need not be reiterated.

7. With respect to **Claim 4**, and corresponding **claim 16** which respectively depends from **claims 1** and **14**, **Feenan** teaches and shows that teaches and shows that " each of said viscoelastic layers is composed of at least one of rubber, foam, and another material having a high damping coefficient." [See page 3 lines 6-7; page 6 line 27 through page 7 line 15] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 2, 14** also apply to **claims 4, 16** and need not be reiterated.

8. With respect to **Claim 8**, **Feenan** teaches and shows "said inner gradient coil assembly generates a magnetic field gradient in response to the presence of a magnetic field generated by said magnet assembly; and wherein said outer gradient coil assembly shields the magnetic field gradient generated by said inner gradient coil assembly from radiating outwardly from the MRI device." [See page 1 line 13 through col. 7 line 15 where the secondary gradient coil conductors effectively cancel the fields

caused by the primary conductors.] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claim 1** also apply to **claim 8** and need not be reiterated.

9. With respect to **Claim 20**, **Feenan** teaches and shows "a radio frequency (RF) coil assembly configured to transmit a radio frequency pulse and detect a plurality of MR signals induced from a subject being imaged." [See Figure 1 RF components 5, 6, 7, and 8 page 6 lines 15-18.] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claim 14** also apply to **claim 20** and need not be reiterated.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. **Claims 3, 5, 6, 7, 9, 10, 11, 12, 15, 17, 18, and 19** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Feenan** PCT publication WO 01/25808 A1 published 12 April 2001; as applied to claims 1, 2, 4 above in further view of **Hirata** US patent 4,594,781 issued September 4th 1990.

14. With respect to **Claim 3**, and corresponding **claims 9 and 15** which respectively depends from **claims 1, 9, and 14**, **Feenan** lacks directly teaching that "said high modulus cylinder is composed of at least one of ceramic, glass filament wound tube, carbon fiber, and another non-conductive material exhibiting a high modulus." However, the cylindrical inner gradient coil core 23, and cylindrical outer gradient coil 13 of **Hirata**, which like the **Feenan** reference has coils 27 and 29 on either side and viscoelastic layer 9, and epoxy 24 are composed of G-FRP (Glass-Fiber Reinforced Plastics). It would have been obvious to one of ordinary skill in the art at the time that the invention was made that modifying the cylindrical mandrel/tube of the **Feenan** reference to be made from G-FRP (Glass-Fiber Reinforced Plastics) would have been a readily obvious modification since a (Glass-Fiber Reinforced Plastics), is non-conductive, does not induce additional undesirable sources of eddy currents, and is strong enough to hold primary and secondary gradient conductor assemblies, which are components of the **Feenan** reference. [See **Hirata** col. 10 line 10 through col. 13 line 2.] The same reasons for rejection, that apply to **claims 1, 2, 9, 10, 14** also apply to **claims 3, 12, and 15** and need not be reiterated.

15. With respect to **Claim 5**, and corresponding **claim 17** which respectively depends from **claims 1 and 14**, **Feenan** lacks directly teaching "at least one additional damping layer positioned between said outer gradient coil assembly and said magnet assembly." However, **Hirata** teaches that an additional viscoelastic layer can be "positioned between said outer gradient coil assembly and said magnet assembly." [See **Hirata** col. 12 lines 38-42.] It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Feenan** with the teaching of **Hirata** because it is conventionally known in the MRI art that if a gradient

assembly is directly mounted to the main static field magnet that any vibration of the gradient assembly will impact the magnet and serve as a cause of additional noise. Therefore, applying the same material which effectively dampens acoustic noise between the gradient components, to other location in the MAIN MRI assembly that are impacted by the noise of the gradient coils, is a readily obvious modification. The examiner notes that **Hirata** also directly suggests this type of modification in col. 12 lines 13 through col. 13 line 2]. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 14** also apply to **claims 5, 17** and need not be reiterated.

16. With respect to **Claim 6**, and corresponding **claim 18** which respectively depends from **claims 1 and 14**, **Feenan** lacks directly teaching that "at least one additional damping layer positioned between said inner gradient coil assembly and said patient positioning area." However, **Hirata** teaches this limitation. [See col. 12 lines 52-56 and col. 12 line 7 through col. 13 line 2 in general.] Additionally, it would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Feenan** with the teaching of **Hirata** because **Feenan** teaches that gradient coils with soundproofing material within the gradient to absorb energy (i.e. the basic structure of **Hirata** which is also taught to include multiple layers of soundproofing material in multiple locations [See **Hirata** col. 12 line 7 through col. 13 line 2 in general]) are already known from earlier MRI prior art references. [See **Feenan** page 2 lines 9-12.] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 14** also apply to **claims 6, 18** and need not be reiterated.

17. With respect to **Claim 7**, and corresponding **claim 19** which respectively depends from **claims 1 and 14**, **Feenan** suggests that that "said damping layer comprises a plurality of high modulus cylinders, and wherein each of said plurality of high modulus cylinders is positioned between at least two viscoelastic layers." [See figures 1, 2, where figure 2 shows the inner acoustic liner of gradient coil component 2 of figure 1; col. 2 line 6 through col. 7 line 19.] additionally, **Hirata** teaches this limitation. [See col. 12 line 7 through col. 13 line 2 in general; Figures 6, 14, 15, 17, 18, 24, 25, 26,

27, and 28.] It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Feenan** with the teaching of **Hirata** because when damping material is located on either side of a vibrating source the vibrations transmitted through the source to other components of the system are minimized or reduced. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 14** also apply to **claims 7, 19** and need not be reiterated.

18. With respect to **Claim 9**, **Feenan** lacks directly teaching "A method of manufacturing a magnetic resonance imaging (MR1) device, comprising: forming a space between a first gradient coil assembly and a second gradient coil assembly; pouring a liquid viscoelastic material into the space; allowing the liquid viscoelastic material to solidify within the space in order to form a damping layer between the first gradient coil assembly and the second gradient coil assembly". However, the **Hirata** reference directly suggests these steps from **Hirata** figures 5, 6, col. 5 lines 28-45; and col. 12 line 7 through col. 13 line 2 because the viscoelastic layers which may be a multiplicity of layers in **Hirata**, and may be located between the gradient coil assemblies and the other components which connect to the gradient coil assemblies, serve the purpose of damping layers to reduce acoustic noise, occur between the gradient coil components, and are formed by the pouring of a viscoelastic liquid into previously prepared hollowed out cylindrical spaces.] It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Feenan** with the teaching of **Hirata** because the older **Hirata** reference teaches how a soundproofing viscoelastic layer is formed, while the **Feenan** reference considers the forming of the actual viscoelastic layer to be an already known aspect of the prior art, based on the **Feenan** teaching of page 2 lines 9-12]

19. With respect to **Claim 10**, **Feenan** lacks directly teaching the step of "positioning at least one high modulus cylinder in the space before said pouring step." However, **Hirata** suggests this limitation because the bore of inner shell component 7 is a cylindrical hollow region already prepared in inner shell 7 prior to the pouring of the viscoelastic liquid. [See Figures 5, 6, col. 5 lines 35-39] The same reasons for rejection,

obviousness, and motivation to combine, that apply to **claim 9** also apply to **claim 10** and need not be reiterated.

20. With respect to **Claim 11**, **Feenan** lacks directly teaching that "the liquid viscoelastic material is at least one of rubber and foam." However, **Hirata** teaches this limitation. [See **Hirata** col. 5 lines 28-39] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claim 9** also apply to **claim 11** and need not be reiterated.

21. With respect to **Claim 13**, **Feenan** lacks directly teaching the step of "positioning plurality of high modulus cylinders in the space such that each of the plurality of high modulus cylinder does not directly contact another high modulus cylinder, the first gradient coil, and the second gradient coil." However, **Hirata** suggests this limitation. [See col. 12 line 7 through col. 13 line 2 where multiple viscoelastic layers are taught to be usable between multiple components and Figures 6, 14, 15, 17, 18, 24, 25, 26, 27, and 28, which show multiple high modulus G-FRP cylinders; col. 5 lines 25-45; col. 10 line 10 through col. 11 line 9.] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claim 9** also apply to **claim 13** and need not be reiterated.

Prior Art of Record

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A) Feenan US patent 6,492,816 B1 issued December 10th 2002, with an effective US date of June 7th 2001.

B) Edelstein et al., 6,441,614 B1 issued August 27th 2002, filed December 2nd 1999.

C) Petropoulos US patent 6,011,394 issued January 4th 2000, filed August 7th 1997.

D) See all of the examiner's citations of the PTO form 892 attached to this office action.

Art Unit: 2859

Conclusion

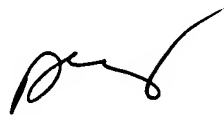
23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.



TAF

September 13, 2004



Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800